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Associations between Achievement Goal Orientations and Academic Performance, Gender, and Pharmacy Year of Students in a UK Pharmacy School

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INTRODUCTION

In order for students to learn and perform effectively, it is imperative that they are sufficiently motivated.^{1,2} Motivation is required for students to develop into independent learners and, as future pharmacists, such learning will be key to enable fulfilment of statutory continuing professional development requirements.³ Previous work has revealed that students studying healthcare disciplines demonstrate changes in motivation as they progress through their educational programs.⁴

For more than thirty years, achievement goal theory has been one of the key motivational theories within the field of education to explain students' motivation for achieving.^{5,6} It was initially postulated that there were two types of achievement goals that illustrated the contrasting abilities of students, namely 'task' or 'ego' involved. Task involvement was mastery-orientated in that the individual's ability to succeed was for the individual's own personal gain and was irrespective of others. Ego involvement differed in that a student's approach towards ability was comparative, ie it was relative to that of others' performance.⁷

Elliot and McGregor (2001) designed a four-factor conceptualization of achievement goals that encompassed a mastery-performance dimension with an approach-avoidance dimension. The four goal orientations, as described by Elliott and McGregor,⁸ are:

- mastery approach - trying to attain competence relative to the task or personal standards (students are motivated to learn or develop skills)

- mastery avoidance - trying to avoid incompetence relative to the task or personal standards (students are motivated to avoid failures or become de-skilled)
- performance approach - trying to attain competence relative to one's peers (students are motivated to outdo others or to be considered talented)
- performance avoidance - trying to avoid incompetence relative to one's peers (students are motivated to avoid doing worse than others or to be considered less talented)

Individuals who have a mastery approach orientation feel competent at a task when they have mastered the task itself, or, when they have improved relative to their own past performance. Those who have a performance approach orientation feel competent at a task when they have performed well on the task relative to others. Mastery-oriented learners may choose harder tasks to ensure they have an overarching knowledge of the subject area. Conversely, students who are performance-oriented learners may opt for easier tasks in which success is guaranteed. Another goal orientation referred to in the literature is 'work avoidance'.^{9,10} Students who are work-avoidant aim to minimize the effort required to learn and perform.^{8,11}

Elliot and McGregor's (2001) Achievement Goal Questionnaire (AGQ) and Elliot and Murayama's (2008) revised version (AGQ-R) are widely used to assess students' achievement goals.^{8,12} Both instruments were developed and validated on American undergraduate psychology students, although a recent study conducted with pharmacy students in Australia, New Zealand, the United Kingdom (UK) and United States of America (USA) has argued that the AGQ is a more psychometrically robust measure than the AGQ-R.¹³

The “Attitude Toward Learning and Performance in College This Semester” (ATL) questionnaire was introduced by Pieper¹⁰ in 2003. It incorporates adapted questions from the AGQ with four additional items previously used by Harackiewicz et al which measure the additional parameter work-avoidance.⁹ The ATL questionnaire has been employed for research involving university students and goal orientation.^{14,15}

The primary aim of this study was to explore associations between student goal orientation scores and academic performance, gender and level of study. A secondary objective was to determine whether there were any relationships between goal orientations and students’ views on various aspects of pharmacy practice. Limited work has been done to date in the area of achievement goal orientations among pharmacy students. This is particularly true in the UK, where undergraduate pharmacy students normally commence 4-year Master of Pharmacy (MPharm) degree programs immediately after finishing their secondary education in school or college (typically at around 18 years of age). From a pharmacy educators’ stance, this work is important to aid understanding of student motivation, given how this appears to influence the ability to develop life-long, self-directed learning skills, help-seeking behaviors, intensive studying strategies and self-efficacy.^{5, 16-19} Moreover, to the best of our knowledge, very few studies have explored the association between achievement goal orientations and academic performance (students’ grades) in pharmacy students (particularly in the UK), although some work has recently been conducted with pharmacy students in Australia.²⁰

METHODS

The School of Pharmacy Ethics Committee at XXX approved the proposed research (Ref 009PMY2014; Feb 7, 2014). Data were collected using an electronic questionnaire

created using the survey website SurveyGizmo™ (SurveyGizmo, Boulder, Colorado; www.surveygizmo.com). The ATL validated questionnaire was used to measure students' goal orientations. This is a self-administered validated instrument with 16 items scored on a 7-point Likert scale ranging from 1 = Not at all true of me to 7 = Very true of me (but Question 16 is reverse coded). Mastery approach (MAP) questions are Questions 3, 7 and 10; Mastery avoidance (MAV) questions are Questions 5, 11 and 14; Performance approach (PAP) questions are Questions 1, 6 and 12; Performance avoidance (PAV) questions are Questions 2, 8 and 15 and Work avoidance (WAV) questions are Questions 4, 9, 13 and 16. Some questions were revised in a minor way for face validity ie the specific 'semester'-based nature of the questions was removed and terms were adapted to make them more relevant for UK university students (for example, we use the word 'module' to represent a specific component of the degree program and therefore this was referred to in the questionnaire). The questionnaire consisted of three sections in total: Section A was the validated questionnaire questions described above, Section B (n=4 questions) related to professional issues (namely, preparation for module examinations; ascertaining if motivation was related to professional practice rather than other aspects of pharmacy; preferred career path following registration as a pharmacist; and the importance of keeping up-to-date with practice developments in pharmacy) and Section C (n=2 questions) gathered demographic (but not identifiable) information on gender and level of study. The majority of questions were closed-response questions and used the 7-point Likert scale outlined above.

The study population was all students enrolled on the MPharm degree program at XXX (n=529) ie a census approach was used. Postgraduate pharmacy students (n=10) piloted the questionnaire and ensured it could be completed within five minutes and that questions were clear and unambiguous. In February 2014, students were invited via email to participate.

They had fourteen days to complete the questionnaire and were provided with a deadline in the invitation. The email contained a unique link to the questionnaire which enabled each student to complete the questionnaire once only. Students were informed that participation in the study was voluntary. The original email invitation was followed up with two reminders which were sent to non-respondents and included a statement that other students had already responded.¹⁹ Additionally, to maximize the response rate, an incentive (of being entered into a draw for one of twenty copies of a recommended formulary used in the School and in pharmacy practice across the UK) was mentioned in the invitation.²¹

As this study also aimed to explore the link between academic performance and goal orientations, additional data relating to student marks was used. This data was obtained via XXX university Student Information System (QSIS) which all academic members of staff in the School have access to.

In terms of including students' marks (grades) in the analysis, yet maintaining anonymity of the responses to the questionnaire, the following approach was utilized: XX (co-author and member of academic staff) randomly generated unique questionnaire ID numbers for each student and was granted temporary access the SurveyGizmo site to upload student email lists and the associated questionnaire ID numbers (which were used when initial and subsequent reminder emails were sent). After this was all set up, XX no longer had access to the site and hence was not be able to view any responses. She also provided YY with a list of unique questionnaire ID numbers and associated marks. The data from the responses to the questionnaire were downloaded by YY to Microsoft Excel[®] and, using the unique questionnaire ID numbers, mean weighted marks were added to this worksheet. YY was only able to identify responses by their unique ID number, and therefore could not trace the

responses back to any individual student. Students were reassured from the outset that their questionnaire responses would remain anonymous, despite analysis involving their marks.

Mean scores for MAP, MAV, PAP, PAV and WAV were calculated. Student respondents were allocated into one of two academic performance groups: high performers (those who scored a mean weighted mark of $\geq 70\%$) and low performers (those who scored a mean weighted mark of $< 70\%$). This cut-off point was chosen as it represents a First Class Honours degree, the highest category of MPharm degree classification within the university. Statistical analysis and comparisons of mean goal orientation scores in relation to gender, pharmacy year and academic performance were conducted via the *t* test, ANOVA and Chi-squared test using R. The relationship between academic performance (students' marks) and goal orientations was further investigated using a linear regression model. An *a priori* level of less than 0.05 ($p < 0.05$) was set as significant. Reliability of the goal orientation question sets was measured using the Cronbach alpha where a coefficient alpha of 0.8 or greater was considered indicative of good reliability.²² Moreover, to test the validity of the goal orientation questions, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were performed. CFA was conducted using the lavaan R package to assess the model's quality of fit to the data. The Tucker Lewis Index (TLI), Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA) fit indices are commonly used with desirable values: TLI > 0.9 , CFI > 0.9 and RMSEA < 0.06 .²³

RESULTS

Demographic Information

A response rate of 60.3% (319/529) was obtained. The number of respondents ($n=319$) relates to students who fully completed the questionnaires. Another 7 questionnaires

were only sparsely completed and therefore were not included in the analyses. There were fewer male than female respondents [93/319 (29.2%) males; 226/319 (70.8%) females] but this was similar to the population of students enrolled on the pharmacy degree program [186/529 (35.2%) males and 343/529 (64.8%) females]. Response rates for first to fourth year (ie Levels 1 to 4) were 39.3% (44/112), 59.6% (81/136), 64.9% (96/148) and 73.7% (98/133), respectively. Ages of respondents were not sought in the questionnaire as almost all (>99%) of students in the degree program were in the 18-23 age bracket, having commenced the MPharm degree immediately after completing secondary education.

Academic Performance

Only 19.4% (62/319) of student respondents were categorized into the high performer group (those with a mean weighted mark of $\geq 70\%$) and the remaining 80.6% (257/319) were allocated into the low performer group. Students in the high performer group (n=62) were more likely to be female than male (52 versus 10; $p=0.018$).

Goal Orientation

Descriptive statistics showing goal orientation scores of students are provided in Table 1 (ie the mean and median score of each goal orientation and Cronbach alpha results). The highest mean score was obtained for the mastery approach orientation and the lowest was for the work avoidance orientation.

Relationships between goal orientations and (a) level in the pharmacy degree program (b) gender and (c) academic performance were investigated and the results of these comparisons are outlined in Table 2. Of the five goal orientations, the mean scores in work avoidance were significantly greater for low than high performers and for male than female students.

Additionally, student respondents who scored ≥ 16 in the work avoidance orientation were three times less likely to be a high performer [19.4% (62/319) of the respondents were high performers; 5.88% (3/51) of the respondents were high performers who had a WAV score ≥ 16].

Moreover, the mean scores in the mastery approach and performance approach orientations differed significantly across the four year groups, with Level 1 (first-year) students obtaining the highest mean scores in both of these (see Table 2).

When the relationship between academic performance (students' marks) and goal orientations was investigated, only MAV and WAV were found to be statistically significant using a linear regression model (MAP $p=0.232$; MAV $p=0.002$; PAP $p=0.054$; PAV $p=0.323$; WAV $p=0.006$, R-squared = 0.07729). The coefficients of MAV and WAV were -0.35134 and -0.25247 respectively implying that avoidance approaches are detrimental to academic performance.

In terms of the factor analysis to test the validity of the goal orientation questions, extracted components from factor analysis accounted for 59% of the total variance in goal orientations. Performance approach goal orientation explained 16% and mastery approach goal orientation explained 13% of the total variance. Work avoidance, mastery avoidance and performance avoidance accounted for 12%, 11% and 7% of the total variance, respectively (see Table 3 which also includes the mean scores for each goal orientation question). The extracted factors clearly reflect the design of the goal orientation questions and have been labelled as such. Furthermore, CFA results of TFI = 0.921, CFI = 0.938 and RMSEA = 0.068 suggest the model is a reasonable fit.

Professional Issues

When asked about preparing for module examinations, 83.4% (266/319) reported that they tried to learn all the material whereas 16.6% (53/319) only learned topics that they thought would be examined. There was no significant difference between the responses to this question and academic performance.

The mean score for the question 'I think it is important for pharmacists to keep up-to-date with practice developments' was 6.23 (possible score range 1-7) and the mean score for the question 'I am more motivated to learn about aspects of pharmacy that relate to professional practice than other aspects of pharmacy' was 5.22 (possible score range 1-7).

After completing pre-registration training (the training year in the workplace after graduation from university, prior to registration with the profession), 41.7% (133/319) stated that they would like to work as a community pharmacist, 35.7% (114/319) as a hospital pharmacist, 15.4% (49/319) wanted to return to university for further study and 7.2% (23/319) stated 'other' (which included industrial pharmacy, becoming a musician and travelling). Interestingly, students who stated that they wished to become a hospital pharmacist were least likely to be work avoidant whereas those who chose 'other' or returning to university were more likely to be work avoidant (WAV mean scores: hospital pharmacist=10.39, community pharmacist=11.34, return to university =12.20, other=13.48; $p=0.016$).

DISCUSSION

This study has revealed many interesting findings in relation to both goal orientations and academic achievements of pharmacy students. It was encouraging to note that overall the highest mean score was obtained for the mastery approach orientation and the lowest was for

the work avoidance orientation. This would be the expectation of any student who hopes to enter a healthcare profession and these findings are similar to those reported in other studies involving medical, nursing and pharmacy students.^{4,24-26} However, it is of concern that the highest mean scores in levels 3 and 4 were for the performance-avoidance orientation, as this has been linked to negative characteristics, such as low intrinsic motivation.²⁷

From a pharmacy educator's viewpoint, it was reassuring to ascertain that firstly, the majority of students reported trying to learn all the material when preparing for module examinations, rather than to question spot and, secondly, that they considered it important for pharmacists to keep up-to-date with practice developments. Additionally, it is noteworthy that students seemed to be more motivated to learn about aspects of pharmacy that relate to professional practice than other aspects of pharmacy. Therefore, staff who teach on our course should be encouraged to reiterate the importance of all components of the degree and outline how the particular subject area relates to practice (be it community, hospital, industry or any other pharmacy setting). Core scientific subjects such as physical and organic chemistry must be taught in a pharmacy context, rather than in isolation.

Low performers (who were more likely to be male than female) were more likely to have a greater score for work avoidance than high performers. Furthermore, from the linear regression model, it appeared that mastery avoidance and work avoidance were important factors in relation to students' grades. Our findings on work avoidance and academic performance appear to mirror those of Barkur et al (2013) who conducted a study with medical students (n=244) in India.²⁸ However, it must be noted that their academic performance groups were categorized differently and so meaningful comparisons cannot be drawn. The same was true for gender in our study; in general, males were more likely to be

work avoidant. Perrot et al (2001) also found significant differences with regard to gender, with male students more likely to be performance orientated than females.⁴ This differs from other work conducted with pharmacy students in the United States of America where there were no significant differences found for goal orientations by gender, although males did score higher for work avoidance than females.²⁴ Knowing about differences in goal orientations is important for various aspects of teaching. For example, for students that are more performance-orientated (PAP or PAV) than the other goal orientations, it could be useful to include information about peer performance on any feedback given to the students, and perhaps introduce competitions into classroom teaching, to improve their motivation to learn. However, this approach will only benefit those performance-avoidant students who are underperforming relative to their peers.

The mean scores in the mastery approach and performance approach orientations differed significantly across the four year groups, with Level 1 students obtaining the highest mean scores in both of these. Changes in goal orientations as pharmacy students progress through the degree program has been noted before.^{18,25} Perhaps Level 1 students are naïve and apprehensive, having just transitioned from secondary to tertiary education, and therefore are motivated to try to learn everything in order to perform well. Unfortunately, Hastings et al (2005) found that pharmacy students developed an attitude of ‘only learning what was necessary to pass’ as they progressed through the degree curriculum.²⁵ Maybe if students were assessed on a greater proportion of the degree course (and not given the option to select certain questions, whilst avoiding other topics completely) this mind-set would diminish. A reduction in a mastery approach over the four levels must surely be of concern to educators and for the pharmacy profession. For example, if this goal orientation score continues to

decrease, the likelihood of actually partaking in lifelong learning to remain up-to-date with practice developments may be jeopardized.

Interestingly, students who stated that they wished to return to university for further studies were more likely to be work avoidant than those choosing other career pathways. Returning to university to do further studying (such as a PhD) may be considered an easier option than starting a full-time career as a pharmacist in either hospital or the community. This is not necessarily a positive finding for academics investing time and effort supervising such students. Additional research could be conducted to establish what motivates students to choose to study pharmacy, and also what drives them to select a particular career path.

In terms of limitations, the questionnaire study provided an insight into respondents' reported rather than actual behavior, respondents self-reported the data, and their opinions were obtained at one point in time only. Secondly, the study was conducted in one pharmacy school in the UK, therefore the results may not be generalizable to other areas of the UK or other parts of the world. Thirdly, we did not collect data on whether respondents were from the UK or were international students (as the small numbers of international students in levels 3 and 4 of the program could have compromised anonymity); ethnicity is known to affect goal orientation and academic achievement.²⁰ There was an underrepresentation of Level 1 and 2 students and non-response bias cannot be ruled out. However, the response rate of 60.1% was considered satisfactory²⁹ particularly in light of guidance from Fincham (2008) who stated that "response rates approximating 60% should be the goal of researchers," (he also provided higher response rate targets for other types of research).³⁰ Reliability of the instrument, as determined by Cronbach alpha, was low for performance avoidance but reasonable for the other orientations. There were fewer students in the high performer group

than the low performer group which may weaken the ability to detect true differences. Additionally, assigning a 70% cut-off for a 'high performer' versus a 'low performer' is subjective. However, it is anticipated that the research will add to the field and will be valuable to educators of various healthcare disciplines as it provides new information on pharmacy students within the UK, and how factors such as gender, pharmacy year, and academic performance correlate with goal orientations.

CONCLUSION

The pharmacy students in this study appeared to have a robust work ethic which ought to be valuable when they qualify as healthcare professionals, although it is of some concern that mean mastery approach scores were lower in the Level 4 cohort than Level 1. From the linear regression model, it appeared that mastery avoidance and work avoidance were important factors in relation to their grades. Indeed, work avoidance may go some way to explaining why female students out-performed male students on the pharmacy course. It therefore seems that achievement goal orientations have a role to play in the academic performance of undergraduate pharmacy students. Educators should ensure that work avoidance is not encouraged or rewarded by including compulsory assessments which test both depth and breadth of knowledge across the entire curriculum. This may also better prepare students to be lifelong learners. It may be valuable to conduct qualitative research to explore what motivates students to choose to study pharmacy and investigate the goal orientations further.

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Table 1 Descriptive Statistics Showing Goal Orientation Scores of Students (n=319)

Goal Orientation	Question numbers	Mean Score (SD)	Median Score	Possible Score Range^a	Cronbach Alpha (0.80 overall)
Mastery approach (MAP)	3,7,10	16.09 (3.13)	16	3-21	0.80
Mastery avoidance (MAV)	5,11,14	15.62 (3.79)	16	3-21	0.75
Performance approach (PAP)	1,6,12	14.04 (4.91)	15	3-21	0.92
Performance avoidance (PAV)	2,8,15	15.77 (3.61)	16	3-21	0.59
Work avoidance (WAV)	4,9,13,16	11.29 (4.54)	11	4-28	0.71
^a Response scale range: 1=not true of me, 7=very true of me (except Question 16 which is a reverse coded item).					

Table 2. Relationship of Goal Orientations and (a) Level in the Program (b) Gender and (c) Academic Performance

Goal Orientation	Level of Study (Pharmacy Year)					Gender			Academic Performance		
	1 Mean Score (SD) n=44	2 Mean Score (SD) n=81	3 Mean Score (SD) n=96	4 Mean Score (SD) n=98	<i>p</i>	Male Mean Score (SD) n=93	Female Mean Score (SD) n=226	<i>p</i>	High performers (n=62) Low performers (n=257)	Mean score (SD)	<i>p</i>
Mastery approach	17.52 (2.74)	15.63 (3.18)	15.90 (3.10)	16.01 (3.15)	0.009	15.90 (3.07)	16.16 (3.16)	0.500	High performers	16.56 (3.34)	0.207
									Low performers	15.97 (3.08)	
Mastery avoidance	16.27 (3.85)	15.47 (3.61)	15.55 (3.62)	15.51 (4.08)	0.673	15.20 (3.59)	15.79 (3.86)	0.198	High performers	14.97 (4.37)	0.182
									Low performers	15.77 (3.62)	
Performance approach	15.32 (4.55)	14.25 (4.60)	14.64 (4.52)	12.72 (5.42)	0.008	14.43 (4.81)	13.88 (4.95)	0.363	High performers	14.52 (5.23)	0.423
									Low performers	13.93 (4.83)	
Performance avoidance	15.41 (4.14)	15.14 (3.58)	16.17 (3.12)	16.06 (3.80)	0.193	15.46 (3.32)	15.89 (3.73)	0.310	High performers	15.47 (4.02)	0.504
									Low performers	15.84 (3.51)	
Work avoidance	10.89 (4.24)	11.90 (4.49)	11.01 (4.60)	11.22 (4.70)	0.533	12.81 (5.48)	10.66 (3.93)	<0.001	High performers	10.26 (3.53)	0.019
									Low performers	11.53 (4.72)	

Table 3. Goal Orientation Items and their Corresponding Factor Loadings

		Factor				
Item	Mean Score	PAP	MAP	WAV	MAV	PAV
1 ^{PAP} My goal is to get better grades than most of the other students	4.47	0.88				
6 ^{PAP} It is important for me to do well compared to other students	4.90	0.78				
12 ^{PAP} I want to do better than other students	4.68	0.90				
3 ^{MAP} Completely mastering the material in my modules is important to me	4.97		0.76			
7 ^{MAP} I want to learn as much as possible	5.78		0.68			
10 ^{MAP} The most important thing for me is to understand the course content as thoroughly as possible	5.33		0.70			
4 ^{WAV} I really don't want to work hard in my modules	2.12			0.54		
9 ^{WAV} I want to do as little work as possible	2.63			0.84		
13 ^{WAV} I want to get through the course by doing the least amount of work possible	2.52			0.90		
16 ^{WAV} I look forward to working really hard in my coursework	4.02		-0.41			
5 ^{MAV} I'm afraid that I may not understand the content of my modules as thoroughly as I'd like	5.24				0.49	
11 ^{MAV} I worry that I may not learn all that I possibly could	5.30				0.78	
14 ^{MAV} I am definitely concerned that I may not learn all that I can	5.07				0.79	
2 ^{PAV} I just want to avoid doing poorly compared to other students	5.06					0.63
15 ^{PAV} My goal is to avoid performing poorly compared to other students	4.83	0.51				0.75
8 ^{PAV} The fear of performing poorly is what motivates me	5.88					

^a Factor loadings of magnitude below 0.4 have been suppressed in the table. Mastery approach (MAP), mastery avoidance (MAV), performance approach (PAP), performance avoidance (PAV) and work avoidance (WAV).